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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Raman Viswanathan

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EXAMINER

DANG, HUNG Q

ART UNIT

PAPER NUMBER

2635

DATE MAILED: 09/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/586,130

Applicant(s)

VISWANATHAN, RAMAN

Examiner

Hung Q Dang

Art Unit

2635

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 June 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-10,12 and 13 is/are rejected.
- 7) ☐ Claim(s) 3,11 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 May 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to because blocks 416, 418, 420, 422 and 424 of Figure 4 lack of descriptive labels. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "seven twisted pairs of insulated conductors within the insulation sheath" as claimed in claim 6 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). To be specific, the specification does not contain the claimed subject matter regarding "the cable has **seven twisted pairs of insulated conductors** within the insulation sheath", as claimed in claim 6. Correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 4, 7, 9, and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthews U.S. Patent 5,148,408 in view of Bowers U.S. Patent 3,259,675.

Regarding claims 1, 7 and 12, Matthews teaches a well logging system comprising:

- A downhole well data sensor (Figure 1, sensors included in unit 24);
- A downhole data transmitter (Figure 1, unit 26);
- A surface data receiver (Figure 1, unit 28); and
- A data transmission cable (Figure 1, unit 16) linking the transmitter and the receiver.

However, Matthews does not specifically teach said transmission cable having at least one pair of insulated conductors wound in a substantially helical twist, an insulation sheath surrounding the twisted pair of conductors and a tensile load carrier surrounding the insulation sheath, the load carrier comprising a sheath of tensile load carrying filaments.

Bowers teaches a cable for specific use with well logging system (Column 1, lines 15-18). Said cable has at least one pair of insulated conductors (Figure 1, any two

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conductors out of conductors 17, 18, 19 and 20 would form a pair of conductors) wound in a substantially helical twist, an insulation sheath (Figure 2, unit 19 and paragraph bridging columns 4 and 5) surrounding the twisted pair of conductors and a tensile load carrier (Figure 1, units 10 and 12) surrounding the insulation sheath, the load carrier comprising a sheath of tensile load carrying filaments being distributed about a perimeter of the load-carrying sheath in radial layers (also regarding claims 4 and 9) (Figure 2, units 11 and 13).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a transmission cable having at least one pair of insulated conductors wound in a substantially helical twist, an insulation sheath surrounding the twisted pair of conductors and a tensile load carrier surrounding the insulation sheath, the load carrier comprising a sheath of tensile load carrying filaments, to the well logging system disclosed by Matthews, as evidenced by Bowers, in order to provide sufficient strength and transmission bandwidth to said data transmission cable.

Regarding claim 10, the well logging system taught by Matthews also includes pressure sensor and temperature sensor (column 3, lines 44-48). Even though, Matthews does not specifically mention about flow sensor, however, one of ordinary skill in the art would recognize that flow sensor has been commonly used in well logging systems. Therefore, by conventionality, it would have been obvious to provide a flow sensor to the well logging system disclosed by Matthews in view of Bowers.

Regarding claim 11, even though Matthews in view of Bowers does not specifically suggest a data cable having an effective capacitance between the twisted

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pair of conductors of less than 30 pF per foot of cable length, however, one skilled practitioner in the art would recognize that such a design can be simply achieved through design experiment in order to determine the parameters that would achieve optimal results.

6. Claims 2, 5, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthews U.S. Patent 5,148,408 in view of Bowers U.S. Patent 3,259,675 and in further view of Belaigues et al. U.S. Patent 4,355,310.

Regarding claims 2 and 13, as already mentioned above, Matthews in view of Bowers teaches a well logging system as claimed in claim 2. However, Matthews in view of Bowers does not teach or disclose a modem being complementarily included to the transmitter and the receiver.

Belaigues et al., in the same field of endeavor, teaches a well logging system wherein the transmitter (Figure 1, unit 34) and the receiver (Figure 1, unit 24) each includes a signal modem (Figure 1, units 22 and 30) complimentary to each other, for transmitting data up and down the surface of the well.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a modem to the transmitter and the receiver of the well logging system disclosed by Matthews in view of Bowers, as evidenced by Belaigues et al., in order to transmit data up and down the borehole, as described above.

Regarding claim 5, the transmission cable taught by Bowers also includes filaments in outer radial layers of the sheath that are greater in size than those of interior layers (Figure 2, filaments in layer 10 are greater in size than filaments in layer 12).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide filaments in outer radial layers of the sheath that are greater in size than those of interior layers, to the transmission cable disclosed by Matthews, as evidenced by Bowers, in order to achieve a strong tensile load sheath for the transmission cable as disclosed by Matthews in view of Bowers.

7. Claims 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthews U.S. Patent 5,148,408 in view of Bowers U.S. Patent 3,259,675 and further in view of Lawrenson U.S. Patent 3,678,177.

Regarding claim 8, as already mentioned above, Matthews in view of Bowers teaches a data cable as claimed in claim 8. However, Matthews in view of Bowers does not specifically teach said cable comprising at least six twisted pairs of conductors disposed around a center conductor, all conductors being within the insulation sheath.

Lawrenson, in the same field of endeavor, teaches a data cable, which comprises at least six twisted pairs of conductors disposed around a center conductor, all conductors being within the insulation sheath (Figures 5-8 and column 2 lines 53-73).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a data cable having at least six twisted pairs of conductors disposed around a center conductor, all conductors being within the insulation sheath, to the well logging system disclosed by Matthews in view of Bowers,

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as evidenced by Lawrenson, in order to achieve a desire strength and transmission bandwidth of said data cable.

Regarding claim 6, the data cable taught by Lawrenson also has seven twisted pairs of insulated conductors within the insulation sheath (Figure 8 and column 2 lines 53-73). Therefore, claim 6 is rejected similarly as claim 8.

8. Claims 3 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthews U.S. Patent 5,148,408 in view of Bowers U.S. Patent 3,259,675 and in further view of Belaigues et al. U.S. Patent 4,355,310 and Doyle et al. U.S. Patent 5,504,479.

As mentioned above, Matthews in view of Bowers and Belaigues et al. teaches a well logging system as claimed in claim 3. However, Matthews in view of Bowers and Belaigues et al. does not suggest utilizing data encoding and decoding methods selected from the group consisting of QAM, CAP and DMT.

Doyle et al., in the same field of endeavor, teaches a CAP (carrierless amplitude and phase) modulation telemetry for use in a well logging system in order to encode/decode transmitting data in said well logging system (column 2, lines 42-65).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a CAP encoding/decoding method to the well logging system disclosed by Matthews in view of Bowers and Belaigues et al., as evidenced by Doyle et al., in order to encode/decode data for transmission in said well logging system.

Conclusion

9) The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a) Rafie et al. U.S. Patent 5,495,547 discloses a combination fiber-optic/electrical conductor well logging cable.

b) Doyle et al. U.S. Patent 5,504,479 discloses a carrierless amplitude and phase modulation telemetry for use in electric wireline well logging.

10) Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Dang whose telephone number is 703-305-4704. The examiner can normally be reached on Monday through Friday from 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Horabik, can be reached on (703) 305-4704. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Hung Dang
9/9/2002
H.D.

HD

MICHAEL HORABIK
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